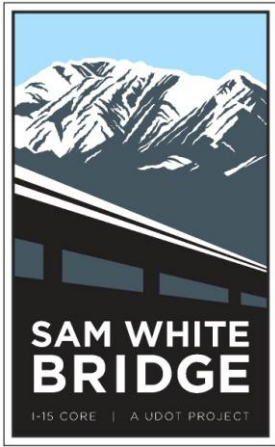# I-15 CORE Design-Builder Perspective Provo River Constructors (PRC)
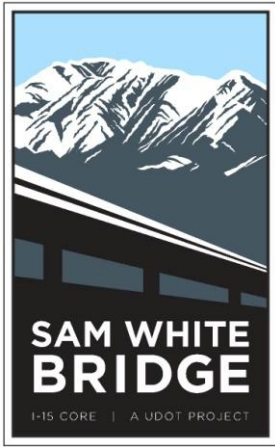
Steve Bone; Sarens North America
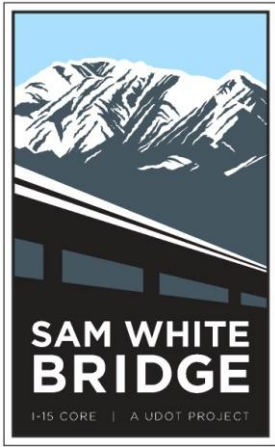
Sarens Group

- Founded in 1955
- Operating in 39 countries with 2,700 employees worldwide
- Main activities
  - Heavy lift and transport services
  - Engineered solutions
  - Specialized lifting and transport equipment
- Market sectors
  - Civil Works
  - Energy - Fossil; Wind; Nuclear
  - Petrochemical and Industrial Facilities

SPMT Operations

- Planning and designing – key considerations
- Structural interface
  - Weight and global load distribution
  - Local load bearing strength
  - Deformation limits
- Bridge geometry
- Travel path strength
- Travel path topography
- SPMT mobilization/demobilization
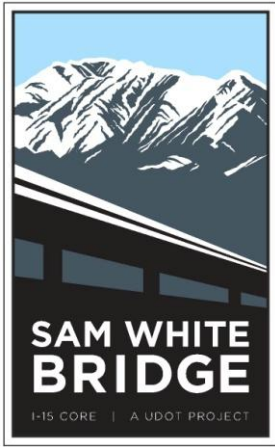- Schedule expectations

Structural Interface

- Weight
  - Nominal-expected and upper limit
- Center of gravity
- Global load distribution (reactions)
- Local load strength and stability
- Deformation limits
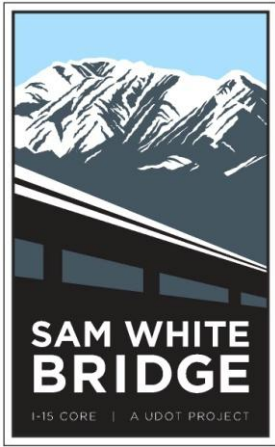- Deformation vs. load re-distribution

Global Load Distribution

- Planning and designing – key considerations
- Affects SPMT & support configuration choices
- Reactions for each lifting and transport case
- SPMT transport is not necessarily rigid body translation
- Bridge, supports and SPMT are deformable
- Iterative process between bridge designer and SPMT contractor – get contractor on board early

Local Load Bearing Strength

- Location of acceptable bearing points / areas on the bottom of the bridge
- Minimum / maximum bearing pad sizes / pressures
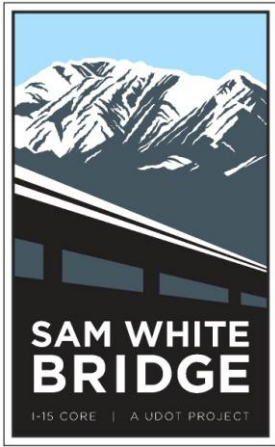- Local lateral stability

Local Load Bearing Strength

- Size of pad
- Local lateral stability

Deformation Limits

- Flexural
- Torsional
- Affects choices for SPMT hydraulic suspension set-up (& thus axle loads)
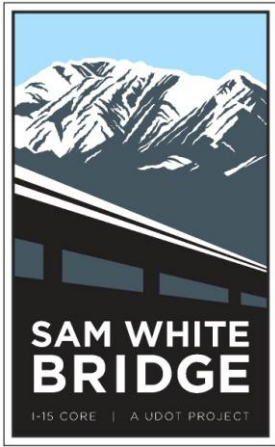- Affects SPMT accommodation to site topography (flexibility helps)
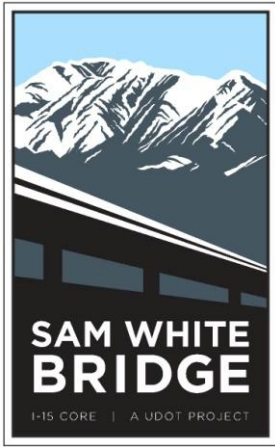
Deformation vs. Load

- SPMT & bridge are flexible
- Load redistributes when the permitted deformations occur
- Address the load cases and provide (simplified) deformation vs. load data
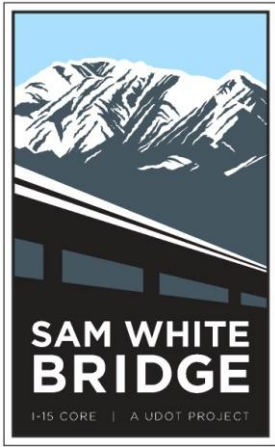
Bridge Nominal Geometry

- SPMT & bridge are flexible
- Provide standard bridge design drawings
- Provide key relative elevations at bottom of bridge
  - At SPMT bearing points
  - At bridge bearings
  - At other points of concern for clearances
- Provide abutment and bent outlines – at time of transport
  - Wing walls; rebar stubs; backwalls
  - Bearings – placement timing
  - Other projections

Travel Path Clearances

- Temporary bents or supports
  - Elevations
  - Outlines
  - Temporary bearing detail & handling
- Egress and access clearances
  - Lift and sweep over temporary bents
  - Along the route
  - Sweep over final bents / abutments
  - Set
- Overhead obstructions
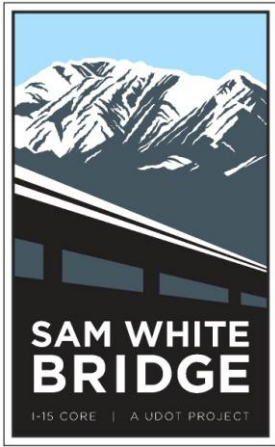
Travel Path Clearances

- Egress and access clearances

Travel Path Clearances

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Travel Path Clearances
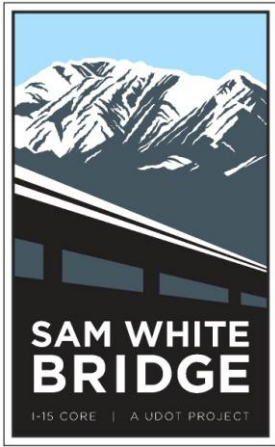
- Bridge bearing details

Travel Path Strength

- Affects choice of SPMT configuration
- Axle line and wheel loads; actual & limits
- Bearing and shearing forces from SPMT
- Bearing capacity improvement
- Underground structures and utilities, if not protected by others

Travel Path Strength

- Forces from tractive drive and turning/steering forces disrupt fill
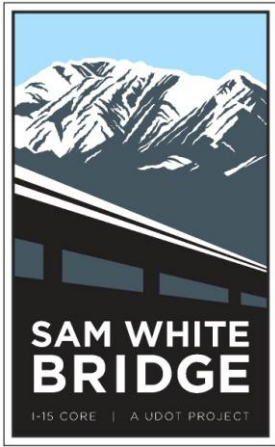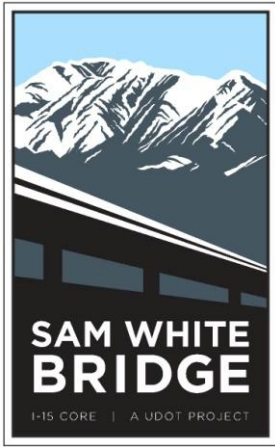- Steel plate over the fill at selected locations

Travel Path Topography

- SPMTs hydraulic suspension adjusts to varying topography…within limits
- Need accurate topo map applicable at time of move
- Limitations on adjustments to contours
  - Paved sections
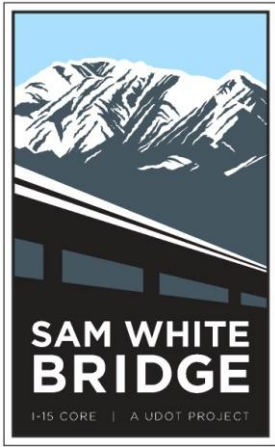 - Fill in active traffic areas

SPMT Assembly

- Offload and laydown areas
- Route from laydown to bridge
- Assembly adjacent or under bridge
  - Clearance to drive SPMT under/out
  - Crane operations vs overheads
- Disassembly after bridge is set
  - Clear route back to assembly location
  - Partial disassembly on roadway

Schedule Expectations

- **Affects SPMT quantities and configuration**
- **Road closure time frames**
  - Way-point vs. time
  - Multi-bridge moves
    - Time to relocate & reconfigure
    - Similarity between

SPMT Operations